

Obstructions to small time local controllability

Beauchard Karine

ENS Rennes

email: Karine.Beauchard@ens-rennes.fr

Abstract

We study the small-time local controllability (STLC) for scalar input control affine systems, in finite dimension. It is known that the entire information about STLC is contained in the evaluation at zero of the Lie brackets of the vector fields. In the 80's, several authors formulated necessary conditions for controllability (obstructions), relying on particular "bad" brackets. In this talk, I will present a unified approach to determine and prove obstructions to STLC, that allows to recover known obstructions and prove new ones, in a relatively systematic way. This approach relies on a recent Magnus-type representation of the state, a new Hall basis of the free Lie algebra over 2 generators and interpolation inequalities. This is a joint work with Frédéric Marbach and Jeremy Leborgne.